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Sexual health and wellbeing among older men and women in England: findings from the English Longitudinal Study of Ageing

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ABSTRACT

We describe levels of sexual activity, problems with sexual functioning and concerns about sexual health among older adults in the English Longitudinal Study of Ageing (ELSA), and associations with age, health and partnership factors. Specifically, a total of 6201 core ELSA participants (56% women) aged 50 to >90 completed a comprehensive Sexual Relationships and Activities questionnaire (SRA-Q) included in ELSA wave 6 (2012/13). The prevalence of reporting any sexual activity in the last year declined with age, with women less likely than men at all ages to report being sexually active. Poorer health was associated with lower levels of sexual activity and a higher prevalence of problems with sexual functioning, particularly among men. Difficulties most frequently reported by sexually active women related to becoming sexually aroused (32%) and achieving orgasm (27%), while for men it was erectile function (39%). Sexual health concerns most commonly reported by women related to their level of sexual desire (11%) and frequency of sexual activities (8%). Among men it was level of sexual desire (15%) and erectile difficulties (14%). While the likelihood of reporting sexual health concerns tended to decrease with age in women, the opposite was seen in men. Poor sexual functioning and disagreements with a partner about initiating and/or feeling obligated to have sex were associated with greater concerns about and dissatisfaction with overall sex life. Levels of sexual activity decline with increasing age, although a sizable minority of men and women remain sexually active until the eighth and ninth decades of life. Problems with sexual functioning were relatively common, but overall levels of sexual health concerns were much lower. Sexually active men reported higher levels of concern with their sexual health and sexual dissatisfaction than women at all ages. Older peoples' sexual health should be managed, not just in the context of their age, gender and general health, but also within their existing sexual relationship.

Key words: sexual health; sexual function; population-based; aging; chronic illness; ELSA

INTRODUCTION

Human sexuality is a universal part of living but stereotypes of older people generally ignore the significance of sexual activity and fulfilment in relation to quality of life and emotional wellbeing. Some population-based surveys have specifically examined the importance of sexuality with respect to health and wellbeing, with studies from both the US (Lindau et al., 2007) and UK (Mercer, Tanton, et al., 2013; Mitchell et al., 2013) indicating that many older adults are engaged in intimate relationships and regard sexuality as an important part of life. While it is recognized that sexuality in later life is influenced by physiological, situational and attitudinal dimensions (Morley & Tolson, 2012), little is known about how sexuality relates to the ageing process more generally. Understanding sexuality across the lifecourse requires multidisciplinary and broad-based data sources in order to examine the social, psychological and biological correlates of sexual health and function. This lack of knowledge, together with the rapid ageing of populations (ONS, 2011), means that there is a need for nationally representative data describing how sexuality interrelates with the health and wellbeing of older adults.

The English Longitudinal Study of Ageing (ELSA), a representative survey of a cohort aged 50 to >90 years, has gathered detailed longitudinal data since 2002 on changes in health, economic and social circumstances as people prepare for and move into retirement and old age (Steptoe, Breeze, Banks, & Nazroo, 2013). The latest wave of ELSA included a comprehensive Sexual Relationships and Activities Questionnaire (SRA-Q) (with versions specific for men and women) capturing information on sexual behaviors and activities, sexual attitudes, sexual function, sexual health concerns and partnership satisfaction. This paper outlines the wide range of sexuality measures now available in ELSA and describes the cross-sectional associations of sexuality with age, health and partnership factors. These new data

will add to the evidence base informing clinicians' understanding and management of older peoples' sexual health.

METHODS

Sample

The data are from wave 6 (2012/2013) of ELSA, a nationally representative panel survey of community-dwelling men and women aged 50 years and older in England. Full details on the study design and methods have been described previously (Steptoe et al., 2013). Data collection consisted of a face-to-face interview and self-completion questionnaires. A total of 10601 individuals participated in wave 6, with 7079 (67%) completing and returning the paper-based Sexual Relationships and Activities Questionnaire (SRA-Q). This analysis was restricted to core ELSA members living in private households in England, excluding partners who were aged less than 50 (as they are not representative of the less than 50 age group), leaving 6201 individuals in the final sample. Item non-response was low for the SRA-Q, and for the sexual health and function variables included in this analysis ranged from <0.1% to 2.6%. ELSA wave 6 received ethical approval from the NRES Committee South Central - Berkshire, and all participants were provided with a letter and leaflet to allow them to give informed consent.

Sexual Relationships and Activities

The ELSA SRA-Q includes questions on attitudes to sex, frequency of sexual activities and behaviors, problems with sexual activities and function, concerns and worries about sexual activities, function and relationships, and details about current sexual partnerships. Items included in the SRA-Q were taken from validated instruments (Mitchell, Ploubidis, Datta, & Wellings, 2012; O'Connor et al., 2008; Waite, Laumann, Das, &

Schumm, 2009), with minor modification to ensure gender specificity, and chosen to harmonize with both the US National Social Life, Health, and Aging Study (NSHAP) (Suzman, 2009) and the third UK National Survey of Sexual Attitudes and Lifestyles (Natsal-3) (Mercer, Wellings, & Johnson, 2013). Face validity of the ELSA SRA-Q was assessed among a sample (n=45) of the ELSA pilot/dress rehearsal panel by trained interviewers under the auspices of NatCen Social Research (NatCen). Table 1 summarizes the items from the SRA-Q presented in this analysis. Wave 6 participants completed the SRA-Q in private and sealed the questionnaire in an envelope upon completion. Participants who reported any sexual activity in the past year were considered to be sexually active. The male and female versions of the SRA-Q are freely available from the web site of the Institute for Fiscal Studies (http://www.ifs.org.uk/ELSA).

Other Assessments

All participants were also asked about their current living arrangements, general health and lifestyle factors during the face-to-face interview. Specifically, they were asked whether a doctor had ever told them they had any of several common conditions, including hypertension, arthritis, cardiovascular diseases, diabetes and asthma. Self-rated health was ranked on a five-point scale (excellent, very good, good, poor or fair), smoking status was recorded as current or non-smoker, and typical frequency of alcohol consumption over the past year as never or rarely (never – once or twice), regularly (once every 2 months – twice a week) or frequently (3 days a week – almost every day). Depressive symptoms were assessed using the eight-item version of the Centre for Epidemiologic Studies Depression (CES-D) scale, with a score of four or more denoting likely depression (Steffick, 2000).

Statistical Methods

All analyses were conducted using STATA SE v13.1 (StataCorp, College Station, TX). Weights were used to correct for sampling probabilities and differential non-response, including to the SRA-Q, and to calibrate back to the 2011 Census population distributions for sex and age. Specifically, these weights accounted for (i) the differential probability of being included in the wave 6 sample and (ii) for non-response to the SRA-Q instrument (full details available from http://www.ifs.org.uk/ELSA). Logistic regression was used to examine the association of sexual activities and problems with chronic conditions and self-rated general health, separately by gender. Adjustments were made for age, partner status, smoking status and frequency of alcohol consumption. Results were expressed as odds ratios (OR) and 95% confidence intervals (CI). Logistic regression was also used to model the simultaneous association of independent variables measuring sexual activities, function and partnership satisfaction (see Table 1), with overall measures of concern about and dissatisfaction with overall sex life. A CES-D score of four or more was also considered as an outcome variable in these models in order to assess the strength of association between sexual activities, function and partnership satisfaction and a global measure of depressive mood. These models were adjusted for age and self-rated health.

RESULTS

Table 2 summarizes the demographic and health characteristics of the analysis sample. The mean (standard deviation) age was 66.9 (9.0) years for men and 66.8 (9.1) years for women. Men were more likely to be either married or cohabitating than women and this disparity increased with age, with 60.2% (95% confidence interval [CI], 65.3 to 74.2) of men aged 80 years and over married or cohabiting versus 27.8% (95% CI, 22.4 to 33.2) of women. The distribution of self-rated health was not significantly different for men and women (P=0.8). Men were more likely than women to report hypertension, cardiovascular disease

(CVD) or diabetes, while women were more likely to report arthritis or depression (all $P<0.05$). A greater proportion of men than women reported they were current smokers and consumed alcohol more frequently.

Overall, men reported more frequent sexual activity and thinking about sex more often than women at all ages (Table 3). Among those who were sexually active (defined as 'any sexual activity in the last year') the frequency of sexual intercourse in the past month declined significantly with age. However, among the sexually active oldest group (80+ years), 19% of men and 32% of women reported having frequent sexual intercourse, i.e., twice a month or more. In addition, in this sexually active oldest group 49% of men and 62% of women reported frequent kissing or petting, while 17% of men and 7% of women reported frequent masturbation.

The prevalence of erectile problems and difficulties achieving orgasm were both strongly associated with increasing age in men (Table 3). For sexually active women, there were overall age-related increases in difficulties relating to arousal, orgasm and lubrication, although the prevalence of these sexual functioning problems declined among those aged 80 years and over. When asked whether their sexual activities and functioning had changed over the preceding year, 33% of women reported declines in their sexual desire, 39% reported declines in frequency of sexual activities and 27% reported declines in their ability to become sexually aroused compared with a year ago (Table 3). However, the proportion of women reporting declines in these sexual activities and functioning did not significantly change with increasing age. In contrast, across age categories, increasingly more men reported declines in their sexual desire, frequency of sexual activities and erectile problems compared with a year ago, although this pattern was least obvious for frequency of sexual activities.

Associations between the five most commonly reported chronic conditions and sexual activities and function varied by gender (Table 4). After adjustment for age, partner status,

smoking and frequency of alcohol consumption, reporting any sexual activity in the past year was negatively associated with arthritis, CVD and diabetes in men, and with high blood pressure and diabetes in women. Among men, high blood pressure was associated with less frequent sexual intercourse and more frequent masturbation and erectile difficulties. Erectile difficulties in men were also associated with the presence of arthritis, CVD, diabetes or asthma. Arthritis was significantly associated with declines in the ability to have an erection in men and declines in sexual desire, frequency of sexual activities or becoming sexually aroused. The adjusted odds ratio of reporting any sexual activity in the past year, or thinking about sex frequently, was significantly lower in both men and women who self-rated their health as fair or poor (Table 4). For men, fair or poor health was also significantly associated with less frequent sexual intercourse, erectile difficulties, difficulty achieving orgasm, and declines in frequency of sexual activities and erectile abilities.

Overall, concerns about levels of sexual desire and frequency of sexual activities (asked only of those who were sexually active) were higher among men than women (Table 5). The percentage of men who were concerned about their ability to have an erection or their orgasmic experience increased in each successive age group, with over a quarter of the oldest men reporting concern about either of these sexual outcomes. Concerns about sexual desire and frequency of sexual activities declined with increasing age among sexually active women, falling from 14% and 10%, respectively in the youngest group to 0% and 2% in the oldest group. Overall, less than 10% of sexually active women reported being concerned about their ability to become sexually aroused or their orgasmic experience, with no evidence of a significant age trend in either of these outcomes. Among those who reported any sexual activity in the past three months, 1% of men and 10% of women reported they felt obligated to have sex, while less than 10% of both men and women reported not feeling emotionally close to their partner when having sex (Table 5). There were no significant age trends seen in

either of these measures of partnership satisfaction. The overall percentage of men and women who reported divergent sexual likes and dislikes to their partner was broadly similar (18% and 17%, respectively), and this was highest among those in the 70-79 years age group. The percentage of women reporting concerns about, or dissatisfaction with, their overall sex life tended to decrease across age groups, whereas the pattern among men showed no clear trend with age. Reported levels of concern about, or dissatisfaction with, their overall sex life were higher at all ages in men compared to women.

Table 6 summarizes the simultaneous associations of sexual functioning and specific partnership factors with reported concerns about and dissatisfaction with overall sex life and depression, among those who reported any sexual activity in the past three months. More frequent sexual intercourse was significantly associated with lower levels of overall concern and dissatisfaction in both men and women. For men, current erectile difficulties were consistently associated with higher levels of concerns and dissatisfaction with overall sex life and depression, while for women, difficulty becoming sexually aroused was only associated with higher levels of concern. With respect to partnership factors, concerns about overall sex life in both men and women were associated with reported feelings of not initiating sex equally, i.e., specifically the male partner initiating sex. Women were also more dissatisfied with their overall sex life and more likely to be depressed when reporting feeling obligated to have sex.

DISCUSSION

These nationally representative data show that many older people, including those over the age of 80, continue to have active sex lives although the frequency of sexual activities declines with increasing age. A substantial number of sexually active men and

women reported problems with their sexual health and the prevalence of these problems generally increased with age. While a number of common chronic health conditions and poorer self-rated general health were associated with decreased sexual activity and functioning, these relationships were more apparent among men as compared to women. Overall, sexually active men were more concerned about their sexual activities and function than women and, with increasing age, these concerns tended to become more prevalent among men and less prevalent among women. Furthermore, women appeared less dissatisfied with their overall sex life than men, and reported decreasing levels of dissatisfaction with increasing age. Poorer sexual functioning and conflicting partnership factors were associated with an increased likelihood of reporting concerns about and dissatisfaction with overall sex life in both men and women.

In our study, the proportion of sexually active participants reporting frequent sexual intercourse was comparable to the pattern of recent sexual activity (≥1 occasion of partnered sex in the past 4 weeks) among similarly aged adults (45 to 74 years) in Natsal-3 (Field et al., 2013), a nationally-representative survey of sexuality in the UK. We found that women were less sexually active than men at all ages, and this gender difference was particularly marked among those respondents not living with a spouse or partner. While this reflects in part the reduced availability of an intimate partner for older women, our measure of any sexual activity in the past year also included masturbation which was reported more frequently among men. However, among those who were sexually active, a similar proportion of men and women reported frequent sexual intercourse and frequent kissing and petting in each successive age group. While the burden of sexual functioning problems tended to increase with age among both men and women, our data hint at a decline in the prevalence of difficulties with sexual arousal, orgasm, dry vagina and pain among sexually active women aged 80->90 years. This may reflect healthy survivor bias among older women and their

partners with better overall sexual function, or behavioral adaptations due to changes in their own, or their partners' health. Similar population-based studies examining sexuality typically have upper age limits around one to two decades younger than here (Laumann et al., 2006; Lindau et al., 2007; Mercer, Tanton, et al., 2013), preventing direct comparisons with the oldest-old in ELSA.

With respect to sexuality and general health, gendered patterns of association have been seen in a number of population-based studies (Field et al., 2013; Laumann et al., 2005; Lindau & Gavrilova, 2010; Lindau et al., 2007). Karraker and colleagues, using a regression decomposition method on data from the National Health and Social Life Survey (NHSLS) and NSHAP, found that women's declining health did not account for a significant portion of sexual frequency decline (Karraker, Delamater, & Schwartz, 2011). Although this is consistent with our findings that chronic illnesses and general health were more clearly linked to sexual activities and functioning in men than women, we did observe that diabetes and fair or poor self-rated health were associated with reduced sexual activity in both genders. Arthritis was associated with a number of sexual problems in men and also with self-reported declines in sexual activity and function in women. Previous studies have shown that the higher the levels of pain, disability and depression associated with arthritis, the greater the detrimental effect on sexual activity and relationships, regardless of gender (Hill, Bird, & Thorpe, 2003; Tristano, 2009). The negative effects of arthritis on sexual health seen here are likely to be multifactorial (disease-related and associated with therapy) and open communication with patients with arthritis about any sexual health problems should be encouraged. Consistent with earlier research (Bacon et al., 2003; Corona et al., 2010; Mak, De Backer, Kornitzer, & De Meyer, 2002; McKinlay, 2000; Sanchez-Cruz et al., 2003), we found erectile difficulties were associated with self-reported chronic illnesses, including hypertension, CVD and diabetes, as well as poor or fair self-rated health. Although we are

unable to distinguish whether these associations are due to psychosocial and comorbid factors commonly found with chronic illnesses and their treatments that may also contribute to erectile problems, it supports the growing body of evidence that erectile dysfunction may serve as an early warning of more serious disease processes sharing a common neuro-vascular pathology (Nehra et al., 2012; Thompson et al., 2005).

We observed that with increasing age, higher proportions of men reported declines over the past year in levels of sexual desire, frequency of sexual activities and erectile abilities. In contrast, the proportion of women reporting declines over the past year in levels of sexual desire, frequency of sexual activities and ability to become sexually aroused were relatively stable with increasing age. While these questions were retrospective, the apparent 'acceleration' in self-rated declines in sexual health with increasing age among men supports the view that men's sexual activities and function are affected more by their own physical health problems as compared to women (Field et al., 2013; Lindau et al., 2007). This gender difference may, in large part, be due to the impacts of common chronic illnesses and their treatments, particularly hypertension, CVD and diabetes, on erectile function; which in turn is strongly associated with decreasing levels of sexual activity and sexual satisfaction (Blanker et al., 2001; Nicolosi et al., 2004). In contrast, the physiological effects of chronic illnesses and treatment regimens on sexual function in women remain poorly understood.

Compared to men, women at all ages reported lower levels of concern about their sexual activities and function, and lower levels of dissatisfaction with their overall sex lives. Together with our observation that men reported thinking about sex more often than women, this is consistent with previous research showing that women are more likely than men to report sex as an unimportant part of their lives, particularly at older ages (Bancroft, Loftus, & Long, 2003; Laumann et al., 2006). However, these specific questions were only asked of those ELSA respondents who reported at least some sexual activity in the last year,

discounting less sexually active or sexually inactive individuals, and potentially underestimating the true prevalence of concerns about sexual health. Perhaps unsurprisingly, more frequent sexual activities and better sexual functioning were associated with lower levels of concern and dissatisfaction with overall sex life among both men and women. Feeling obligated to have sex and divergent sexual likes/dislikes were associated with increased concerns about overall sex life in men, while feeling obligated to have sex increased dissatisfaction with overall sex life and depression in women. Initiation of sex by the male partner appeared to increase levels of concern about overall sex life in both genders. Studies among younger adults have shown that women initiate sex less often (Baumeister, Catanese, & Vohs, 2001), and are more likely to consent to unwanted sexual activity than men (Impett & Peplau, 2002). Overall, our findings in older adults support the view that greater partner agreement and a favorable balance of sexual exchanges are important correlates of higher sexual satisfaction and psychological wellbeing (Christopher & Sprecher, 2000).

Strengths and limitations

The main strengths of ELSA are a large, nationally representative community-based sample covering midlife to the oldest-old, not recruited explicitly to answer questions on their sexual health. As a data resource, ELSA is unique in having detailed health, psychosocial, economic and genetic measures for multidisciplinary analysis of sexuality and health (Steptoe et al., 2013). Recent research on sexuality and aging has tended to focus on medicalized notions of desire, capacity and dysfunction, particularly among older men in relation to erectile problems (Tiefer, 2002). However, this medical perspective, which highlights physical and mental health concomitants of ageing and their effect on sexuality, is

increasingly being replaced by a broader biopsychosocial perspective (DeLamater, 2012). This alternative view explicitly considers biology (health and illness), psychological influences (knowledge, attitudes) and relationship characteristics (quality, satisfaction) as key influences on sexual functioning (DeLamater, 2012). Although we did not explicitly set out to test any given theoretical models of sexual response at older ages in this descriptive paper, these new data from the SRA-Q, along with the wide range of biological, psychological and social data already available in ELSA, will provide a valuable resource to examine how sexual response in later life is associated with these biopsychosocial factors. In addition, more than half of those who completed the SRA-Q were cohabiting couples. Having direct measures of each partner's sexual health will allow future dyadic analyses examining how sexuality, health and wellbeing covary in close relationships. The ELSA team encourages the fullest possible use of these data by the wider research community, with datasets openly available to researchers and analysts typically within six months after each wave of data collection has been completed.

Although limitations of the study have been described previously (Steptoe et al., 2013), certain factors need to be highlighted here. The representativeness of our data is restricted to community-dwelling adults, as institutionalized individuals were not surveyed. ELSA did not oversample ethnic or sexual minority groups and the results presented here may not be generalizable to ethnic minority, and lesbian, gay and other groups who do not identify themselves as heterosexual. In common with similar studies our data were self-reported and, although the interview methods have accepted validity (Fenton, Johnson, McManus, & Erens, 2001) we cannot exclude reporting bias. Those ELSA participants who did not complete the SRA-Q may not have done so due to pre-existing sexual problems and/or feeling that they were 'retired' from sex. The non-response weights will have partly dealt with this, with weighting for non-response to the SRA-Q instrument directly accounting

for the variation in response according to demographic and health characteristics. These weights, however, would not have dealt with sexual behavior characteristics that were unrelated to the factors used for weighting. Our data, therefore, may have overestimated the prevalence of sexual activities, particularly among the oldest-old, and potentially underestimated the prevalence of sexual problems. The cross-sectional data preclude any examination of the temporal nature of associations and we cannot distinguish to what degree age-associated changes in sexual activities and function reflect ageing related or age cohort effects. The nature of the routing of the SRA-Q meant that questions pertaining to concerns and dissatisfaction about sexual activities, function and relationships were limited to those participants reporting any recent sexual activity (at least once in the last year). This prevented any further examination into whether sexually inactive participants were concerned or dissatisfied with their own sexual health and functioning.

Conclusions

These data describe the variety of sexual activities, problems and concerns among middle aged and older men and women in England, and highlight the importance of general health and interpersonal dimensions with regard to sexual function and satisfaction. A sizable minority of older people in their 70s and 80s remain sexually active, although sexual problems are relatively prevalent. Health professionals should be open to discussing sexual health concerns with older adults and proactive in offering treatment and counselling to maximize sexual health and wellbeing. Although men's sexual activities and function appear more impacted by chronic conditions and poorer overall health compared to women, interventions for couples should not ignore situational and relational factors potentially affecting both sexual partners. Spouses and sexual partners do not live in isolation and the

management of older adults' sexual health to improve quality of life and wellbeing should ideally involve both partners.

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Table 1 | Core sexuality indicators used in wave 6 of the English Longitudinal Study of Ageing (ELSA)

Topic*	Response set
Sexual behavior and activities (…during the past month)	
How often did you think about sex? *How many times have you had or attempted sexual intercourse (vaginal, anal or oral)?* *How frequently did you engage in other sexual activities (kissing, petting or fondling)?* *How often did you masturbate?*	*7-point scale: 'not at all' to 'more than once a day'. Those answering 2-3 times a month or more were classified as participating frequently in that particular sexual behavior or activity*
Sexual functioning (…during the past month)	
How often did you feel sexually aroused during sexual activity? [women] *How often did you have an uncomfortably dry vagina during sexual activity? [women]* *How often did you experience pain or discomfort during/after sexual activity? [women]*	*5-point scale: 'never' to 'always'. Sexual arousal: women answering never or much less than ½ the time were classified as having difficulty becoming aroused . Dry vagina/pain: women answering much more than ½ the time or always were classified as having difficulty with lubrication or pain*
Are you able to get or keep an erection which would be good enough for sexual activity? [men]	*4-point scale: 'always able' to 'never able'. Men answering never able or sometimes able were classified as having current erectile difficulties*
When you had sexual stimulation how difficult was it for you to reach orgasm?	*5-point scale: 'impossible' to 'not at all'. Those answering moderately difficult to impossible were classified as having difficulty achieving orgasm*
Changes in sexual behavior and function (…compared with a year ago)	
Has your sexual desire/drive changed? *Has the overall frequency of you sexual activities changed?* *Has your ability to become sexually aroused changed? [women]* *Has your ability to have an erection changed? [men]*	*5-point scale: 'increased a lot' to 'decreased a lot'. Those answering decreased moderately or decreased a lot were classified as experiencing a decline in that particular sexual behavior or function over the preceding year*
Sexual health concerns (…during the past month)	
Have you been worried or concerned by your level of sexual desire? *Have you been worried or concerned by the frequency of your sexual activities?* *Are you worried or concerned by your current ability to become sexually aroused? [women]* *Have you been worried or concerned by your ability to have an erection? [men]* *Have you been worried or concerned by your orgasmic experience?*	*5-point scale: 'not at all worried or concerned' to 'extremely worried or concerned'. Those answering moderately, very or extremely worried or concerned were classified as being concerned about that particular sexual behavior or activity*

Partnership satisfaction (…during the past three months)	
Who usually initiated sexual activity during the past three months?	*3-items: 'I did', 'My partner(s) and I did equally', 'My partner(s) did'*
How often did you have sex primarily because you felt obliged to or it was your duty? *How often did you and your partner share the same sexual likes and dislikes?* *How often did you feel emotionally close to your partner when you had sex?*	*5-point scale: 'never' to 'always'. Obligation: those answering much more than ½ the time or always were classified as feeling obligated. Sexual likes/emotional closeness: those answering never or much less than ½ the time were defined as having divergent likes/emotions*
How worried or concerned have you been about your overall sex life?	*5-point scale: 'not at all worried' to 'extremely worried'. Those answering moderately, very or extremely worried were classified as being concerned*
How satisfied have you been with your overall sex life?	*5-point scale: 'very satisfied' to 'very dissatisfied'. Those answering moderately dissatisfied or very dissatisfied were classified as dissatisfied*

*All questions were asked of both genders except where specified

Table 2 | Characteristics of participants in ELSA wave 6 who answered the sexual relationships and activities questionnaire. Values are weighted percentages.

Characteristic	*Men* (n=2745)	*Women* (n=3456)
Age (years)		
50-59	37.1	33.8
60-69	32.9	31.6
70-79	20.0	21.0
80->90	10.0	13.7
Partnership status		
Married or cohabiting	73.2	59.4
Separated or divorced	11.2	15.5
Widowed	6.9	19.2
Never married	8.8	5.9
Age left full-time education		
≥ 19 years	23.7	16.3
15-18 years	67.7	73.6
≤ 14 years	8.7	10.3
Self-rated general health		
Very good or excellent	40.7	40.5
Good	32.5	32.9
Fair or poor	26.8	26.6
Self-reported chronic conditions		
High blood pressure*	40.3	38.1
Arthritis	28.3	43.9
CVD†	22.5	18.5
Diabetes*	12.1	10.2
Asthma*	9.0	10.9
Depression‡	11.0	16.4
Current smoker	14.6	13.5
Frequency of alcohol consumption§		
Never or *rarely*	20.9	40.0
Regularly	55.1	45.0
Frequently	24.0	15.1

*Also includes self-reported use of medications to control/prevent these chronic conditions †Heart conditions and/or stroke ‡CES-D (8-item) score of ≥4 §Typical frequency of alcohol consumption over the past year (*never* or *rarely* = never to once or twice, *regularly* = once every 2 months to twice a week, *frequently* = 3 days a week to almost every day)

Table 3 | Distribution of self-reported sexual activities and problems. Values are weighted percentages (95% confidence intervals)

Variable	Number*	All ages	Age group (years)			
			50-59	60-69	70-79	80->90
Men						
Any sexual activity in the past year						
All	2080/2735	77.7 (75.9 to 79.5)	94.1 (91.8 to 96.3)	84.5 (82.1 to 87.0)	59.3 (55.5 to 63.1)	31.1 (25.1 to 37.1)
Living with a partner	1624/2070	80.3 (78.4 to 82.2)	96.3 (94.3 to 98.2)	86.4 (83.8 to 89.1)	60.6 (56.2 to 64.9)	37.0 (29.0 to 45.0)
Not living with a partner	456/665	70.5 (66.4 to 74.6)	89.0 (83.3 to 94.6)	77.7 (71.9 to 83.5)	54.5 (46.4 to 62.7)	22.3 (13.8 to 30.7)
Thinking about sex frequently	2161/2724	80.2 (78.5 to 81.9)	95.0 (92.9 to 97.1)	84.7 (82.2 to 87.1)	65.7 (61.9 to 69.5)	38.7 (32.2 to 45.2)
Frequent sexual intercourse†						
All	919/2061	48.5 (45.8 to 51.2)	59.6 (54.7 to 64.4)	44.2 (40.8 to 47.6)	32.8 (28.2 to 37.4)	19.0 (9.8 to 28.2)
Living with a partner	747/1608	50.7 (47.7 to 53.7)	64.0 (58.5 to 69.9)	45.4 (41.6 to 49.2)	33.7 (28.6 to 38.8)	23.2 (11.3 to 35.0)
Not living with a partner	172/453	41.5 (35.7 to 47.2)	48.2 (38.6 to 57.7)	39.7 (32.2 to 47.2)	29.2 (18.4 to 40.0)	8.7 (0.1 to 20.2)
Frequent kissing, fondling or petting†						
All	1299/2061	63.6 (61.0 to 62.2)	68.4 (63.7 to 73.1)	62.0 (58.7 to 65.3)	57.1 (52.2 to 62.0)	48.6 (37.0 to 60.3)
Living with a partner	1087/1609	68.1 (65.2 to 70.9)	73.2 (67.9 to 78.5)	65.2 (61.6 to 68.8)	63.3 (58.0 to 68.7)	57.9 (44.0 to 71.8)
Not living with a partner	212/452	49.7 (43.9 to 55.5)	56.2 (46.6 to 65.7)	49.8 (42.0 to 57.5)	31.2 (20.8 to 41.6)	24.1 (6.7 to 41.4)
Frequent masturbation†	866/2059	44.3 (41.6 to 47.0)	54.0 (49.1 to 59.0)	41.1 (37.8 to 44.4)	30.4 (25.8 to 35.1)	16.7 (8.8 to 24.5)
Erectile difficulties	1196/2701	39.2 (37.1 to 41.4)	15.5 (12.1 to 18.9)	35.5 (32.4 to 38.5)	66.1 (62.4 to 69.8)	88.3 (84.2 to 92.4)
Difficulty achieving orgasm‡	336/1841	15.6 (14.0 to 17.4)	8.3 (5.5 to 11.1)	14.9 (12.4 to 17.3)	33.2 (28.1 to 38.3)	52.2 (38.8 to 65.7)
Compared with a year ago decreased…						
Level of sexual drive/desire	904/2724	32.3 (30.1 to 34.4)	24.2 (20.1 to 28.3)	30.1 (27.2 to 33.0)	42.6 (38.7 to 46.5)	49.1 (42.3 to 55.8)
Frequency of sexual activities†	768/2071	36.8 (34.2 to 39.4)	35.9 (31.1 to 40.7)	34.6 (31.4 to 37.9)	42.9 (38.1 to 47.8)	42.3 (31.0 to 53.6)
Ability to have an erection†	534/2074	23.8 (21.6 to 25.9)	16.5 (12.8 to 20.3)	24.9 (21.9 to 27.8)	36.8 (32.0 to 41.5)	47.2 (35.7 to 58.6)
Women						
Any sexual activity in the past year						
All	1836/3432	53.7 (51.8 to 55.7)	75.9 (72.2 to 79.6)	59.9 (57.2 to 62.6)	34.3 (31.1 to 37.6)	14.2 (9.9 to 18.5)
Living with a partner	1409/2078	69.9 (67.4 to 71.9)	86.1 (82.8 to 89.4)	69.6 (66.5 to 72.7)	48.3 (43.7 to 53.0)	41.1 (29.8 to 52.4)
Not living with a partner	427/1353	30.4 (27.5 to 33.3)	57.6 (50.3 to 64.9)	36.8 (32.1 to 41.5)	16.8 (13.3 to 20.3)	3.7 (1.2 to 6.2)
Thinking about sex frequently	1543/3416	45.5 (43.5 to 47.5)	69.4 (65.5 to 73.3)	48.4 (45.7 to 51.2)	25.4 (22.5 to 28.3)	10.4 (7.0 to 13.9)

Frequent sexual intercourse†						
All	858/1814	50.1 (47.3 to 52.8)	59.1 (54.5 to 63.7)	44.9 (41.4 to 48.4)	35.7 (30.3 to 41.1)	31.6 (16.2 to 46.9)
Living with a partner	686/1388	52.5 (49.4 to 55.6)	64.0 (58.7 to 69.2)	45.2 (41.3 to 49.1)	38.3 (31.9 to 44.6)	36.3 (18.3 to 54.3)
Not living with a partner	172/426	41.9 (36.2 to 47.6)	46.1 (37.3 to 54.8)	43.6 (35.7 to 51.5)	26.6 (16.6 to 36.6)	12.0 (0.0 to 34.1)
Frequent kissing, fondling or petting†						
All	1189/1812	67.7 (65.2 to 70.2)	72.8 (68.7 to 76.8)	64.7 (61.3 to 68.1)	58.6 (53.0 to 64.2)	61.5 (45.5 to 77.5)
Living with a partner	984/1388	72.8 (70.2 to 75.5)	78.7 (74.4 to 82.9)	68.7 (65.0 to 72.4)	64.7 (58.4 to 71.1)	71.8 (56.0 to 87.7)
Not living with a partner	205/424	50.5 (44.7 to 56.2)	57.0 (48.3 to 65.8)	46.9 (39.0 to 54.9)	36.8 (26.0 to 47.6)	9.9 (0.0 to 28.9)
Frequent masturbation†	275/1805	15.9 (13.8 to 18.0)	20.4 (16.6 to 24.2)	13.1 (10.8 to 15.4)	9.2 (5.9 to 12.4)	7.0 (0.0 to 14.1)
Difficulty becoming sexually aroused‡	502/1435	32.3 (29.5 to 35.1)	24.5 (20.3 to 28.6)	37.6 (33.7 to 41.5)	51.0 (44.2 to 57.9)	34.6 (14.7 to 54.6)
Difficulty achieving orgasm‡	385/1365	27.1 (24.3 to 29.8)	23.4 (19.1 to 27.7)	30.6 (26.9 to 34.4)	32.1 (25.2 to 39.0)	34.1 (13.2 to 54.9)
Dry vagina during sexual activity‡	312/1411	19.1 (16.9 to 21.4)	13.3 (10.0 to 16.6)	25.0 (21.5 to 28.4)	30.3 (23.8 to 36.8)	12.6 (0.6 to 24.6)
Pain during/after sexual activity‡	155/1413	10.1 (8.3 to 11.9)	8.4 (5.7 to 11.1)	11.6 (9.0 to 14.2)	14.5 (9.4 to 19.6)	6.2 (0.0 to 14.7)
Compared with a year ago decreased…						
Level of sexual drive/desire	1071/3383	33.0 (31.2 to 34.9)	33.1 (29.2 to 37.0)	29.9 (27.4 to 32.5)	35.5 (32.1 to 38.9)	36.4 (30.4 to 42.5)
Frequency of sexual activities†	707/1824	39.2 (36.5 to 41.8)	38.0 (33.5 to 42.5)	37.9 (34.5 to 41.3)	44.3 (38.7 to 49.9)	48.1 (31.8 to 64.4)
Ability to become sexually aroused‡	380/1425	26.6 (23.9 to 29.3)	25.2 (20.8 to 29.5)	27.4 (23.8 to 31.0)	28.0 (21.7 to 34.2)	36.3 (16.7 to 56.0)

*Number who answered the question affirmatively out of total number of respondents to the question. The denominator varies due to questionnaire routing and some participants declining to answer some questions

†Any sexual activity in the past year. ‡Any sexual activity in the past month

Table 4 | Association of sexual activities and problems with the five most commonly reported chronic conditions and self-rated general health (independent variables) in ELSA wave 6. Values are adjusted odds ratios (95% confidence intervals)

	Chronic illness					Fair or poor general health[¶]
Dependent Variable	**High Blood Pressure**	**Arthritis**	**CVD**	**Diabetes**	**Asthma**	
Men						
Any sexual activity in the past year	0.90 (0.72 to 1.13)	0.74 (0.57 to 0.95)*	0.55 (0.41 to 0.75)***	0.53 (0.38 to 0.73)***	0.93 (0.63 to 1.36)	0.39 (0.30 to 0.50)***
Thinking about sex frequently	1.01 (0.80 to 1.27)	0.69 (0.54 to 0.89)**	0.68 (0.50 to 0.91)**	0.82 (0.58 to 1.14)	0.87 (0.61 to 1.25)	0.47 (0.36 to 0.61)***
Frequent sexual intercourse†	0.78 (0.62 to 0.99)*	0.71 (0.56 to 0.91)**	0.81 (0.57 to 1.15)*	0.72 (0.50 to 1.02)	0.76 (0.53 to 1.09)	0.51 (0.38 to 0.69)***
Frequent masturbation†	1.29 (1.02 to 1.64)*	1.14 (0.89 to 1.47)	1.00 (0.67 to 1.47)	1.13 (0.76 to 1.66)	0.72 (0.48 to 1.07)	0.74 (0.55 to 1.01)
Erectile difficulties†	1.79 (1.40 to 2.29)***	1.32 (1.05 to 1.68)*	1.47 (1.06 to 2.05)*	2.05 (1.43 to 2.95)***	1.89 (1.26 to 2.83)**	2.26 (1.70 to 3.01)***
Difficulty achieving orgasm‡	1.30 (0.96 to 1.76)	1.01 (0.75 to 1.36)	1.74 (1.16 to 2.61)**	1.70 (1.11 to 2.61)*	2.07 (1.30 to 3.28)**	1.51 (1.06 to 2.16)*
Compared with a year ago decreased…						
Level of sexual drive/desire†	1.26 (0.99 to 1.61)	1.17 (0.93 to 1.48)	1.39 (0.97 to 1.98)	1.57 (1.13 to 2.18)**	1.10 (0.78 to 1.54)	1.21 (0.92 to 1.59)
Frequency of sexual activities†	1.07 (0.85 to 1.35)	1.23 (0.97 to 1.54)	1.01 (0.74 to 1.36)	1.02 (0.73 to 1.41)	1.02 (0.73 to 1.43)	1.36 (1.03 to 1.79)*
Ability to have an erection†	1.26 (0.98 to 1.62)	1.40 (1.10 to 1.79)**	1.26 (0.87 to 1.81)	1.43 (1.03 to 1.99)*	1.23 (0.86 to 1.77)	1.57 (1.18 to 2.09)**
Women						
Any sexual activity in the past year	0.79 (0.65 to 0.97)*	0.86 (0.71 to 1.03)	0.80 (0.58 to 1.12)	0.63 (0.45 to 0.90)**	0.83 (0.63 to 1.08)	0.69 (0.55 to 0.86)**
Thinking about sex frequently	0.82 (0.67 to 1.00)	0.86 (0.71 to 1.03)	0.79 (0.57 to 1.10)	0.85 (0.60 to 1.20)	0.90 (0.69 to 1.17)	0.68 (0.54 to 0.85)**
Frequent sexual intercourse†	0.85 (0.66 to 1.09)	1.03 (0.81 to 1.30)	0.96 (0.65 to 1.43)	0.80 (0.49 to 1.28)	0.84 (0.58 to 1.20)	0.85 (0.62 to 1.16)
Frequent masturbation†	0.98 (0.68 to 1.39)	0.83 (0.60 to 1.16)	1.12 (0.60 to 2.09)	0.57 (0.28 to 1.17)	1.31 (0.81 to 2.12)	1.00 (0.65 to 1.53)
Difficulty becoming sexually aroused‡	1.09 (0.82 to 1.46)	1.04 (0.80 to 1.35)	0.88 (0.55 to 1.39)	0.89 (0.52 to 1.51)	0.95 (0.64 to 1.41)	1.18 (0.83 to 1.68)
Difficulty achieving orgasm‡	0.96 (0.68 to 1.34)	1.24 (0.93 to 1.66)	1.11 (0.66 to 1.88)	0.80 (0.37 to 1.74)	0.68 (0.42 to 1.12)	1.37 (0.92 to 2.02)
Dry vagina during sexual activity‡	0.97 (0.68 to 1.38)	1.24 (0.92 to 1.67)	0.74 (0.41 to 1.34)	0.54 (0.28 to 1.07)	0.91 (0.57 to 1.46)	0.90 (0.58 to 1.42)
Compared with a year ago decreased…						
Level of sexual drive/desire†	0.93 (0.72 to 1.21)	1.48 (1.16 to 1.88)**	1.09 (0.70 to 1.67)	0.99 (0.60 to 1.66)	1.35 (0.95 to 1.94)	1.28 (0.94 to 1.74)
Frequency of sexual activities†	0.92 (0.72 to 1.18)	1.27 (1.00 to 1.60)*	1.39 (0.94 to 2.06)	1.04 (0.64 to 1.67)	1.39 (0.96 to 1.95)	1.29 (0.97 to 1.73)
Ability to become sexually aroused‡	1.10 (0.80 to 1.51)	1.36 (1.03 to 1.80)*	1.29 (0.78 to 2.14)	1.19 (0.64 to 2.20)	1.10 (0.71 to 1.69)	1.41 (0.98 to 2.03)

*P<0.05; **P<0.01; ***P<0.001

†Any sexual activity in the past year. ‡Any sexual activity in the past month. [¶]Versus *good* to *excellent* self-rated general health.

Odds ratios (95% CI) from separate logistic regressions for each chronic condition; adjusted for age, partner status, smoking status and frequency of alcohol consumption.

Table 5 | Distribution of self-reported concerns and satisfaction about sexual activities, function and relationships (among those reporting any sexual activity over the past year). Values are weighted percentages (95% confidence intervals)

			Age group (years)			
Variable	**Number***	**All ages**	**50-59**	**60-69**	**70-79**	**80->90**
Men						
Concerned about…						
Level of sexual desire	311/2076	15.2 (13.2 to 17.2)	14.6 (10.9 to 18.4)	15.4 (13.0 to 17.8)	15.7 (12.1 to 19.3)	19.6 (10.3 to 28.9)
Frequency of sexual activities	286/2069	13.3 (11.5 to 15.1)	13.2 (9.9 to 16.5)	14.7 (12.4 to 17.1)	11.7 (8.6 to 14.8)	7.9 (2.2 to 13.6)
Ability to have an erection	328/2076	13.9 (12.2 to 15.7)	9.3 (6.4 to 12.2)	15.2 (12.8 to 17.5)	21.4 (17.5 to 25.3)	26.8 (16.6 to 37.0)
Orgasmic experience	210/1767	10.8 (9.1 to 12.5)	8.3 (5.4 to 11.2)	11.2 (8.9 to 13.4)	15.6 (11.7 to 19.5)	26.9 (13.0 to 40.8)
Felt obligated to have sex†	18/1354	1.3 (0.6 to 1.9)	0.8 (0.1 to 1.5)	2.0 (0.8 to 3.2)	0.2 (0.0 to 0.7)	5.8 (0.0 to 16.8)
Divergent sexual likes/dislikes to partner†	237/1345	18.3 (15.6 to 20.9)	16.2 (11.6 to 20.7)	17.6 (14.3 to 20.8)	28.9 (23.0 to 34.9)	15.2 (3.7 to 26.8)
Did not feel emotionally close to partner†	73/1342	6.1 (4.4 to 7.9)	6.6 (3.5 to 9.6)	5.5 (3.3 to 7.7)	6.4 (3.3 to 9.5)	4.9 (0.0 to 11.5)
Concerned about overall sex life	402/2046	18.8 (16.7 to 20.8)	17.2 (13.5 to 20.9)	21.3 (18.6 to 24.1)	17.7 (13.9 to 21.4)	18.2 (8.8 to 27.6)
Dissatisfied with overall sex life†	287/1343	19.9 (17.3 to 22.4)	18.7 (13.7 to 22.4)	22.5 (18.8 to 26.2)	20.2 (14.8 to 25.5)	19.2 (6.8 to 31.6)
Women						
Concerned about…						
Level of sexual desire	185/1831	10.7 (8.9 to 12.4)	13.6 (10.4 to 16.8)	8.9 (6.9 to 10.9)	7.6 (4.7 to 10.5)	0.0 (--)
Frequency of sexual activities	135/1823	7.7 (6.2 to 9.2)	10.2 (7.4 to 13.0)	6.3 (4.7 to 8.0)	4.1 (1.7 to 6.4)	2.4 (0.0 to 6.9)
Ability to become sexually aroused‡	109/1426	7.4 (5.8 to 9.0)	7.2 (4.8 to 9.6)	7.6 (5.4 to 9.7)	6.6 (2.9 to 10.3)	11.6 (0.1 to 27.5)
Orgasmic experience‡	88/1364	7.0 (5.3 to 8.7)	7.7 (4.9 to 10.5)	5.9 (4.0 to 7.8)	8.4 (4.2 to 12.5)	3.6 (0.0 to 10.4)
Felt obligated to have sex†	136/1310	10.1 (8.2 to 12.0)	10.1 (7.2 to 13.0)	10.5 (7.8 to 13.2)	10.7 (6.2 to 15.2)	2.4 (0.0 to 7.0)
Divergent sexual likes/dislikes to partner†	213/1303	17.3 (14.8 to 19.9)	17.5 (13.4 to 21.6)	16.7 (13.5 to 19.9)	20.3 (14.2 to 26.5)	10.1 (0.1 to 21.3)
Did not feel emotionally close to partner†	103/1308	7.9 (6.2 to 9.7)	7.7 (4.9 to 10.5)	7.9 (5.7 to 10.2)	9.8 (5.3 to 14.4)	3.7 (0.0 to 10.9)
Concerned about overall sex life	234/1769	13.1 (11.3 to 15.0)	14.7 (11.5 to 18.0)	13.6 (11.2 to 16.1)	8.1 (4.8 to 11.3)	3.6 (0.0 to 10.4)
Dissatisfied with overall sex life†	156/1295	12.3 (10.2 to 14.5)	12.6 (9.4 to 15.7)	14.0 (10.7 to 17.2)	5.9 (2.1 to 9.6)	3.9 (0.0 to 11.4)

*Number who answered the question affirmatively out of total number of respondents to the question. The denominator varies due to questionnaire routing and some participants declining to answer some questions

†Any partnered sexual activity in the past three months. ‡Any sexual activity in the past month

Table 6 | Association of sexual functioning and partnership factors with reported concerns and dissatisfaction with overall sex life and depressive symptoms (dependent variables) among those reporting any sexual activity over the past three months. Values are adjusted odds ratios (95% confidence intervals)

	Concerned about overall sex life		Dissatisfied with overall sex life		Depressed (CESD score ≥4)	
Independent Variable	***Men***	***Women***	***Men***	***Women***	***Men***	***Women***
Frequently thinking about sex	1.31 (0.55 to 3.16)	1.56 (0.85 to 2.87)	2.09 (0.86 to 4.98)	1.64 (0.88 to 3.05)	1.66 (0.52 to 5.31)	1.21 (0.69 to 2.14)
Frequent sexual intercourse	0.44 (0.28 to 0.68)***	0.22 (0.13 to 0.37)***	0.38 (0.25 to 0.57)***	0.30 (0.18 to 0.50)***	1.35 (0.69 to 2.65)	0.97 (0.58 to 1.62)
Frequent masturbation	1.16 (0.77 to 1.76)	1.52 (0.75 to 3.07)	1.49 (1.02 to 2.16)*	1.49 (0.81 to 2.75)	0.95 (0.53 to 1.70)	0.94 (0.48 to 1.83)
Erectile difficulties	4.56 (2.91 to 7.13)***	--	3.24 (2.08 to 5.05)***	--	2.71 (1.38 to 5.34)**	--
Difficulty becoming sexually aroused	--	2.02 (1.13 to 3.62)*	--	1.31 (0.76 to 2.26)	--	1.62 (0.89 to 2.97)
Felt obligated to have sex	4.04 (1.55 to 10.5)**	1.43 (0.71 to 2.85)	2.08 (0.70 to 6.23)	2.51 (1.31 to 4.84)**	1.53 (0.36 to 6.47)	2.05 (1.05 to 4.00)*
Divergent sexual likes/dislikes	1.68 (1.02 to 2.78)*	0.93 (0.46 to 1.92)	1.37 (0.85 to 2.21)	0.75 (0.42 to 1.34)	1.68 (0.86 to 3.28)	1.47 (0.70 to 3.08)
Not emotionally close during sex	1.62 (0.72 to 3.64)	1.12 (0.47 to 2.70)	1.64 (0.74 to 3.63)	1.78 (0.88 to 3.60)	1.74 (0.61 to 4.94)	1.78 (0.81 to 3.90)
Man initiated sex†	1.62 (1.07 to 2.45)**	1.76 (1.06 to 2.92)*	1.33 (0.92 to 1.93)	1.22 (0.73 to 2.05)	1.45 (0.83 to 2.55)	1.05 (0.55 to 1.99)
Woman initiated sex†	1.47 (0.72 to 2.98)	2.10 (0.81 to 5.44)	1.42 (0.72 to 2.78)	2.36 (0.94 to 5.94)	0.68 (0.22 to 2.17)	0.70 (0.21 to 2.41)

*P<0.05; **P<0.01; ***P<0.001

†Reference category = 'My partner and I did equally'.

Odds ratios (95% CI) from logistic regressions with independent variables entered simultaneously for each model (additionally adjusted for age and self-rated health)